Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Self-protected interactions in DNA-functionalized colloids: Nano Contact Glue MIRJAM LEUNISSEN, Center for Soft Matter Research, New York University, REMI DREYFUS, ROUJIE SHA, NADRIAN SEEMAN, DAVID PINE, PAUL CHAIKIN — The ability of single-stranded DNA to form a variety of sequence-dependent secondary structures, such as hairpins, is frequently used in DNA nanotechnology, but has so far not been explored for the directed assembly of (nano)colloidal structures. We will show how mono- and bimolecular hybridization events in the DNA coatings of individual micrometer-sized beads can give rise to unusual, quench-rate dependent aggregation behavior, and how it can give additional control over the colloidal self-assembly process. For example, it provides us with 'self-protected' interactions that are activated by temperature or prolonged proximity and that facilitate the formation of finite-sized structures. A simple quantitative model describes the underlying competition between intra- and interparticle hybridization events, based on the known thermodynamic parameters of the DNA sticky ends.

Mirjam Leunissen
Center for Soft Matter Research, New York University

Date submitted: 21 Nov 2008 Electronic form version 1.4